COUNCIL
STUDY SESSION
COMMITTEE
DATE _____
AGENDA ITEM _____

CITY OF OLYMPIA
Olympia, Washington

LAND USE AND ENVIRONMENT COMMITTEE MEETING
April 23, 2007

SUBJECT:	Use of Porous Pavement
ORIGINATED BY:	Public Works Department
STAFF CONTACT:	Craig Tosomeen, Water Resources Engineer, 709-2737, ctosomee@ci.olympia.wa.us Andy Haub, Planning and Engineering Manager, 753-8475, ahaub@ci.olympia.wa.us
REQUESTED COUNCIL ACTION:	**Refine staff recommendations regarding the future use of porous pavements. Forward issues to City Council.**
STAFF RECOMMENDATION:	**Option 1: Support Risk Management Alternative B. Develop policy and financial options for City Council consideration.**
DOCUMENTS ATTACHED:	1. Relative Risks of Porous Pavements and Roadway Designs 2. Sustainable Action Map
BUDGET IMPACT & SOURCE OF FUNDS:	None at this time. However, porous pavement techniques present financial risks and costs above and beyond traditional roadway practices. To date, City budgets have not adequately covered these costs.
PRESENTERS AND OTHERS NOTIFIED:	Michael Mucha, Director of Public Works David Riker, Transportation Director Rich Hoey, Water Resources Director
BACKGROUND:	Over the past decade, Olympia has willingly experimented with and implemented new technologies for managing stormwater and minimizing environmental impacts from urban land uses. These efforts include a low-impact zoning district, high-tech water quality treatment devices, narrow streets, and porous pavements. Porous pavement and similar under-pavement infiltration techniques (collectively referred to as porous roadway designs) maintain community expectations for street width and function, while reducing stormwater management costs and environmental

impacts. The pavements offer the opportunity to infiltrate stormwater through the surface and forego the need for stormwater ponds. Environmentally, these pavements and roadway designs infiltrate precipitation to groundwater, rather than discharging all or part of the precipitation to surface waters.

Olympia regularly uses porous concrete in publicly-funded sidewalks projects and recently used porous concrete in the bike lane on RW Johnson Boulevard. Porous asphalt is sometimes used in local parking lots. While porous materials are encouraging, the products remain experimental and therefore subject to higher levels of risk than traditional asphalt and concrete pavements.

Our work seeks to refine the porous pavement technologies such that risks of structural and infiltration failures as well as construction and maintenance costs are minimized.

ANALYSIS AND OPTIONS:

Porous pavements improve urban stormwater management as well as reduce roadway construction costs. City Transportation and Storm and Surface Water program staff as well as City Council members conceptually support the continued or increased use of porous pavements and roadway designs. Various Olympia environmental and transportation policies also support their use.

Conversely, unknowns associated with the use of porous pavements and roadway designs over the long-term present appreciable financial risks. Levels of acceptable risk and funding sources are not defined. The potential for porous pavements is subject to policy decisions regarding uncertainty, risks, and responsibilities.

Initial construction costs of porous pavements and roadway designs are typically less than the costs of traditional pavements with stormwater management ponds. Costs for ongoing maintenance, risk of short-term failure, and long-term replacement are higher for porous pavements and roadway designs.

Risks and benefits of porous pavements and roadway designs are summarized in the attached Sustainable Action Map (Attachment 2).

<u>Risk and Financial Analysis</u>

Risks include the potential for structural failure, clogging of pores, and long-term repair and replacement costs. Different types of porous roadways and their applications present unique risks (Attachment 1). Covering some of these financial risks is beyond

the current means of the City's Transportation and Storm and Surface Water programs. Capital funding for porous pavement is largely borne by the Transportation program. Maintenance and cleaning of porous pavements is minimally funded by the Storm and Surface Water program.

The new and experimental nature of porous pavements does not support the application of life cycle cost analysis and subsequent comparisons to traditional pavement costs. Assumptions necessary for such an analysis can not be adequately bounded at this time. Initial construction costs are highly variable, product quality is challenging to ensure, and long-term maintenance and replacement needs are largely unknown. Costs and benefits of the pavements and roadway designs are highly site specific. Monitoring of existing demonstration projects will probably not generate improved cost information for at least another five years.

Accepting the financial uncertainties, appropriate levels of risk for failures or lower than expected performance need to be determined. Failures could require roadway reconstruction or flood/environmental mitigation.

Risk Management Alternatives

Given community interest in porous pavements, continued use of the technique could follow one of several alternatives during the next three to five years:

- Alternative A: Monitor current projects and wait for other communities and researchers to refine the technology and its costs. Information may not be available for 10 to 20 years. Olympia is currently one of the municipal leaders in the field.

- Alternative B: Continue to install porous sidewalks and bike lanes where appropriate. Look for additional opportunities for low to moderate risk projects including transportation CFP projects.

  Seek to improve the technology, understand potential applications, and define costs. This approach requires the development of policies and funding managing risks, increased maintenance, and ultimately replacing the pavements.

- Alternative C: Incorporate porous pavement and roadway designs into City roadway projects unless risks are excessive. Conduct evaluations of risk and benefit for each project. Given

higher risks for major projects, comprehensive financial policies need to be defined upfront.

- Alternative D: Adapt porous pavement and roadway designs for use on both public and private projects. The City would accept long-term responsibility for privately constructed, dedicated projects.

Staff recommends Alternative B with continued support for demonstration projects (e.g. Decatur Street/Washington State Department of Ecology grant) as well as limited implementation on favorable, relatively low-risk major projects. Some projects can readily provide redundancy of stormwater management techniques (e.g., an adjacent stormwater pond) or have a low risk of property damage if infiltration fails. For example, the RW Johnson Boulevard porous roadway project is immediately adjacent to the publicly-owned Black Lake Meadows stormwater facility. Stormwater overflows from a failed pavement could be accommodated by the facility.

Funding Issues

As we continue to experiment with porous pavement and roadway applications, some projects may fail or otherwise not meet expectations. Staff recommends setting aside funds from the Transportation and Storm and Surface Water programs for the purpose of fully or partially addressing problems. Under this proposal, the risk of failure would become institutionalized and manageable.

Creating an "insurance" program for porous pavement could be approached in several different ways:

- Provide a citywide fund that could be used at any location as needed.
- Budget funds for each project based on the risk of the project.
- Purchase vacant land in conjunction with projects for potential use as a traditional stormwater pond.
- Construct a minimal level of stormwater system redundancy into the projects.

Alternatively, unanticipated funding needs could be dealt with on a case-by-case basis during annual capital funding processes.

Upfront costs for capital construction and ongoing maintenance of the pavements need to be incorporated into Transportation project

and Storm and Surface Water operation and maintenance budgets, respectively.

Council Policy Decisions

In summary, current financial policies do not adequately address risks and responsibilities associated with porous pavements. With Committee guidance, staff could develop policy options for Council consideration. The policies would:

- Establish a City implementation strategy for porous pavement and roadway designs relative to risks. Staff recommends Alternative B.
- Determine cost shares for one-time capital, ongoing maintenance, and long-term repair/replacement responsibilities for Transportation and Storm and Surface Water programs.
- Implement an "insurance" fund for project problems.

Option 1: Support Risk Management Alternative B. Develop policy and financial options for City Council consideration.

Pros
1. Formalizes risk management expectations and responsibilities.
2. Supports continued porous pavement work.
3. Pursues long-term cost savings for transportation projects.

Cons
1. Potentially commits funds.
2. Accepts financial risks.

Option 2: Modify alternative(s) prior to forwarding to City Council.

Pros
1. Better facilitates potential City Council decisions.

Cons
1. None.

Option 3: Defer consideration of alternatives. Do not forward policy and financial issues to City Council.

Pros

1. Minimizes risks and financial commitments.

Cons

1. Minimizes further use of porous pavements.
2. Accepts high costs of transportation-related stormwater management.